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EXAMINER	
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ART UNIT	PAPER NUMBER
2123	38

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Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action	Application No. 08/889,440	Applicant(s) Takeuchi et al.
	Examiner Hugh Jones	Art Unit 2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED Feb 27, 2003 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid the abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

THE PERIOD FOR REPLY [check only a) or b)]

a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.

b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on ________. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.

2. ☐ The proposed amendment(s) will not be entered because:

(a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);

(b) ☐ they raise the issue of new matter (see NOTE below);

(c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

(d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: ________

3. ☐ Applicant's reply has overcome the following rejection(s): ________

4. ☐ Newly proposed or amended claim(s) ________ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5. ☒ The a) ☐ affidavit, b) ☐ exhibit, or c) ☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because:
see enclosed

6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7. ☐ For purposes of Appeal, the proposed amendment(s) a) ☐ will not be entered or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: ________

Claim(s) objected to: ________

Claim(s) rejected: ________

Claim(s) withdrawn from consideration: ________

8. ☐ The proposed drawing correction filed on ________ is a) ☐ approved or b) ☐ disapproved by the Examiner.

9. ☐ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). ________.

10. ☐ Other:

Hugh Jones

HUGH JONES
PRIMARY EXAMINER
ART UNIT 2123

DETAILED ACTION

- Advisory Action continuation: Applicants have not responded to most of the particulars of the rejections nor the Examiner's responses to Applicant's arguments. They are, therefore, repeated.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 3-9, 11-20 and 22-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

3. As per claims directed at "formed particles" (claims 1, 3-9 and 11-31), Examiner has reviewed pp. 31-33 of the specification. The specification only describes the composition of the combined particles; but, does not describe how the components of the formed (*combined*) particle are *formed*, as would be required to make and/or use the invention. A reader would have to reinvent the invention. The meaning is not clear. The claims recite "formed particles". The particles therefore would have to be *combined* somehow during the course of the simulation. How is this done? It would constitute undue experimentation for a reader of any issued patent to make and/or use the claimed invention. Therefore, ***Examiner again repeats the request for a***

copy of Applicant's software package so that Examiner can determine what constitutes "combined" or "formed".

- Applicant has amended claims 1, 16, 20, 23, 24. Applicant has not pointed out enabling support in the specification for these amendments. In particular, the Examiner has been unable to locate enabling support for "*a chemical composition of the particle*" and "*a physical condition*". With respect to matter added via amendment, Section 714.02 of the MPEP states in part:

> The prompt development of a clear issue requires that the replies of the applicant meet the objections to and rejections of the claims. ***Applicant should also specifically point out the support for any amendments made to the disclosure***. See MPEP § 2163.06.

5. Claims 1, 3-9, 11-20 and 22-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

5. As per claims directed at "formed particles" (claims 1, 3-9 and 11-31), Examiner has reviewed pp. 31-33 of the specification. The specification only describes the composition of the combined particles; but, does not describe how the components of the formed (*combined*) particle are *formed*, as would be required to make and/or use the invention. A reader would have to reinvent the invention. The meaning is not clear. The claims recite "formed particles". The particles therefore would have to be *combined* somehow during the course of the simulation. How is this done?

- Applicant has amended claims 1, 16, 20, 23, 24. Applicant has not pointed out written description support in the specification for these amendments. In particular, the Examiner has been unable to locate written description support for "*a chemical composition of the particle*" and "*a physical condition*". Please note that the Examiner has reviewed the portions of the specification as directed by Applicants.

6. **Claims 1, 16, 20, 23, 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.** The is pertains to "*a physical condition*". The phrase is ambiguous.

Claim Interpretations

7. In general, the applicants are disclosing method and apparatus to simulate the trajectory of a "combined" or "formed" particle. *There is an abundance of publications concerning this topic as well as animated display of such simulations*. The Applicant has stated that the concept "*combined*" is of no consequence.

8. In so far as Applicants have stated (first paragraph, page 5, paper # 26) that limitations directed at "combining" are not to be given patentable weight, the Examiner interprets that reference to "absorbate" and "substrate" refer to intended use. There are no functional limitations which refer to "absorbate" and "substrate" other than *denotation* of the individual particles. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed

invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Therefore, any prior art which recites simulation of a trajectory of a "combined particle" is interpreted as reading on the claims.

9. The prior art rejections will be based on this interpretation of the specification and claims.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1, 3-9, 11-20, 22-31 are rejected under 35 U.S. C. 103 (a) as being unpatentable over (Misaka et al. *or* Baumann et al.) in view of the Examiner's own experience and the taking of Official Notice.

12. Misaka et al. disclose a dry-etching process simulator wherein a surface reaction model is used to simulate topological evolutions by taking into account the existence of adsorbed radicals on the substrate surface. Baumann et al. disclose 3D modeling of sputtering using a mesoscopic

hard-sphere Monte Carlo model. (see fig. 1 of Baumann et al.). Baumann et al. simulate the behavior of *clusters* as they interact with a substrate (note that the use of ion cluster beams and molecular beams for deposition and/or sputtering are well known techniques; this phenomena has also been simulated.). Both sets of inventors are concerned with the simulating the dynamics of particles which are interacting with a substrate during processing of the substrate. The claims are reviewed and the contributions by each inventor, as outlined above, are noted.

13. **As per claim 1, this is concerned with an apparatus for simulating phenomena of a particle formed of adsorbate particles and substrate particles,** Misaka et al.: figs. 1, 2, 3b, 4, 5 ("calculate fluxes"); col. 1, lines 35-68; col. 2, lines 29-34 and 49-59; col. 3, lines 16-68; col. 4, lines 50-65; Baumann et al.: pg. 4.4.1 and fig. 1), **comprising: a kinetic condition setting unit** (this is inherent in particle simulators such as monte Carlo simulators) **which sets information for defining a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period** (Misaka et al.: figs. 1, 2, 3b, 4, 5 ("calculate fluxes"); col. 1, lines 35-68; col. 2, lines 29-34 and 49-59; col. 3, lines 16-68; col. 4, lines 50-65; Baumann et al.: pg. 4.4.1 and fig. 1) **wherein the information includes a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction** (Misaka et al.: abstract; figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: temperatue: fig. 6]; inherent on pg. 4.4.1); **and**

a particle motion computing unit which generates the individual particles in accordance with the information set by the kinetic condition setting unit and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate and substrate particles, each adsorbate particle having a corresponding emission source (again, this is inherent in particle simulators such as Monte Carlo simulators; Misaka et al.: abstract; fig. 1,2; col. 2 lines 49-59 and 59-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: pg, 4.4.1);

for each adsorbate particle, the kinetic condition setting unit sets a region indicating a position of the corresponding emission source (Misaka et al.: fig. 1, # 15; also inherent in figs. 2, 7, 8b, 10; Baumann et al.: inherent in fig. 1), and

the particle motion computing unit generates each adsorbate particle in accordance with the position of the corresponding emission source (Misaka et al.: fig. 1, # 15; Baumann et al.: inherent in fig. 1).

14. **As per claim 3, this is concerned with an apparatus as in claim 1, wherein before generating the adsorbate particles, the particle motion computing unit generates the substrate particles** (this would seem to be inherent as well as obvious; why generate particles which are to interact with a target if the target is not there; Misaka et al.: figs. 1, 2, 3b, 4, 5, 7, 8b, 9, 10; col. 1, lines 35-68; col. 3, lines 16-68; col. 4, lines 50-65; Baumann et al.: fig. 1; inherent in fig. 2).

15. **As per claim 4, this is concerned with an apparatus as in claim 1, further comprising:**

a display which allows a user to enter the information set by the kinetic condition setting unit (this is standard with respect to particle simulators in general. I have personally done this as it pertains to Monte Carlo simulations).

16. **As per claim 5, this is concerned with an apparatus as in claim 1, wherein the kinetic condition setting unit sets information for generating the substarate particles** (obviously, this information must be provided for each species; Misaka et al.: figs. 1, 2, 5 ("calculate fluxes"),- col. 2, lines 29-34 and 49-59, Baumann et al.: pg. 4.4.1).

17. **As per claim 6, this is concerned with an apparatus as in claim 1, wherein each adsorbate particle is formed of atoms** (Misaka et al.: fig. 1 ("radical"), fig. 2, fig. 4 (b,c,d); Baumann et al. - fig. 1; pg. 4.4.1) - this is also *inherent*;

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against center of mass of the adsorbate particle (inherent in clusters); **and**

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides a random orientation to the atoms of the adsorbate particle (Official notice is taken that this physical phenomena and approximations so as to take it into

account in simulations were well known in the art at the time of the invention. [see for example studies of ion attachment to electrodes submersed in salt solutions, studies of nucleation, or the motion of electrons around moving atoms or molecules]).

18. **As per claim 7, this is concerned with an apparatus as in claim 6, further comprising:**

a display which allows a user to enter the information set by the kinetic condition setting unit (this is standard with respect to particle simulators in general. I have personally done this as it pertains to Monte Carlo simulations).

19. **As per claim 8, this is concerned with an apparatus as in claim 1, wherein each adsorbate particle is formed of atoms** (Misaka et al.: fig. 1 ("radical"), fig. 2, fig. 4 (b,c,d); Baumann et al.: fig. 1; pg. 4.4.1),

the information set by the kinetic condition setting unit includes information indicating whether the smaller particles of a respective adsorbate particle are static against center of mass of the adsorbate particle (inherent in simulation of clusters), **and**

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides an initial velocity to the atoms of the absorbate (I assume the applicant is talking about molecules here? [in which case the parts of the molecule interact with each other via vibrational modes, and thus are not bound]) **particle** (Official notice is taken that

this physical phenomena and approximations so as to take it into account in simulations were well known in the art at the time of the invention. [see for example studies of ion attachment to electrodes submersed in salt solutions, studies of nucleation, or the motion of electrons around moving atoms or molecules]).

20. **As per claim 9, this is concerned with an apparatus as in claim 1, wherein, when generating an adsorbate particle, the particle motion computing unit provides a random direction within a cone pointed at a substrate and being centered at a point of generation of center of mass velocity of the adsorbate particle** (this is inherent in particle simulations in general, and in Monte Carlo simulations, in particular [see for example studies of gaseous discharges wherein an electron is emitted from a cathode or an electron is ejected from an atom due to collisional ionization]).

21. **As per claim 11, this is concerned with an apparatus as in claim 1, further comprising a display which displays the information set by the kinetic condition setting unit** (this is standard with respect to particle simulators in general. I have personally done this as it pertains to Monte Carlo simulations).

22. **As per claim 12, this is concerned with an apparatus for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the apparatus comprising:**

an input device which allows a user to designate a region (this is standard with respect to particle simulators in general. I have seen done this as it pertains to Monte Carlo simulation

[specifying the position of the cathode which is to eject electrons]; Misaka et al.: figs, 1, 5, 7, 8b, 9, 10- Baumann et al.: inherent in fig. 1);

a kinetic condition setting unit which, for each adsorbate particle, sets the region designed by the user as a region indicating a position of the corresponding emission source (Misaka et al. fig. 1, # 15; Baumann et al.: inherent in fig. 1); **and**

a particle motion computing unit which generates the adsorbate particles in accordance with the position of the corresponding emission source as indicated by the region designated by the user and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles (Misaka et al.: fig. 1, # 15; fig. 5 - Baumann et al.: pg. 4.4.1).

23. As per claim 13, this is concerned with an apparatus as in claim 12, wherein the input device is a display (this is standard with respect to particle simulators in general. I have personally done this as it pertains to Monte Carlo simulations).

24. As per claim 14, this is concerned with an apparatus as in claim 12, further comprising a display which displays the information set by the kinetic condition setting unit (this is standard with respect to particle simulators in general. I have personally done this as it pertains to Monte Carlo simulations).

25. As per claim 15, this is concerned with an apparatus as in claim 14, wherein the display shows the adsorbate particles generated by the particle motion computing unit and indicates the motion computed by the particle motion computing unit (this is standard in the

art; I have seen this type of display at conferences [Official notice is taken that this feature was well known in the art at the time of the invention.).

26. As per claim 16, this is concerned with an apparatus for simulating phenomena of a particle formed of adsorbate particles and substrate particles, comprising:

a kinetic condition setting unit (this is inherent in particle simulators such as monte Carlo simulators) **which sets information for defining kinetic conditions of the adsorbate particles** (Misaka et al.: figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-59; Baumann et al.: pg. 4.4.1) **wherein the information includes a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction** (Misaka et al.: abstract; figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: temperatue: fig. 6]; inherent on pg. 4.4.1); **and**

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and the position of the corresponding emission source and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source (again, this is inherent in particle simulators such as Monte Carlo simulators; Misaka et al.: abstract; fig. 1, 2 col. 2 lines 49-59 and 59-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: pg. 4.4.1).

27. As per claim 17, this is concerned with an apparatus as in claim 16, wherein

the adsorbate particles move towards the substrate particles (Misaka et al. - fig. 1, 2, 3b; Baumann et al.: fig. 1),

the kinetic condition setting unit sets a region for defining an initial position of the adsorbate particles (Misaka et al.: figs. 1, 5; Baumann et al.: inherent on pg. 4.4.1),

the apparatus further comprises a display which displays the relationship between the region set by the kinetic condition setting unit and a region indicating a position of a substrate particle forming said particle formed of adsorbate particles and substrate particles (this is standard in the art; I have seen this type of display at conferences [Official notice is taken that this feature was well known in the art at the time of the invention.]).

28. As per claim 18, this is concerned with an apparatus as in claim 17, wherein

the kinetic condition setting unit sets information for providing a direction of velocity to the adsorbate particles (Misaka et al.: fig. 1 # 15; Baumann et al.: inherent on pg. 4.4.1), **and**

the display shows the direction of velocity with respect to the region set by the kinetic condition setting unit and the region indicating the position of a respective substrate particle (this is standard in the art; I have seen this type of display at conferences [Official notice is taken that this feature was well known in the art at the time of the invention.]).

29. As per claim 19, this is concerned with an apparatus as in claim 16, further comprising a display which displays the information set by the kinetic condition setting

unit (this is standard with respect to particle simulators in general. I have personally done this as it pertains to Monte Carlo simulations).

30. As per claim 20, this is concerned with a computer-implemented method for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particles having a corresponding emission source, the method comprising the steps of:

setting information for defining a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period (Misaka et al.: fig. 1, # 15; Baumann et al.: inherent on pg. 4.4.1) **wherein the information includes a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction** (Misaka et al.: abstract; figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: temperatue: fig. 6]; inherent on pg. 4.4.1);

generating the adsorbate particles in accordance with the information set in the setting step and the position of the corresponding emission source (Misaka et al.: fig. 1, # 15; Baumann et al.: inherent on pg. 4.4.1), **and**

computing motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles (again, this is inherent in

particle simulators such as Monte Carlo simulators, Misaka et al.: abstract; fig. 1, 2; col. 2 lines 49-59 and 59-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: pg. 4.4.1).

31. **As per claim 22, this is concerned with a computer-implemented method for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the method comprising the steps of**

setting, for each adsorbate particle, a region indicating a position of the corresponding emission source (this is standard with respect to particle simulators in general. I have seen done this as it pertains to Monte Carlo simulation [specifying the position of the cathode which is to eject electrons]; Misaka et al.: figs, 1, 5, 7, 8b, 9, 10; Baumann et al.: inherent on pg. 4.4.1),

generating the adsorbate particles in accordance with the position of the corresponding emission source as indicated by the region set in the setting step (Misaka et al.: fig. 1, # 15; Baumann et al.: inherent on pg. 4.4.1);

computing motion of the generated adsorbate particles, to simulate phenomena of the combined particle (Misaka et al.: fig. 1, # 15; Baumann et al.: pg. 4.4. 1); and

simulating phenomena of said particle formed of adsorbate particles and substrate particles in accordance with the computed motion.

32. **As per claim 23, this is concerned with a method for simulating phenomena of a particle formed of adsorbate particles and substrate particles, said method comprising:**

setting information for defining kinetic conditions of the adsorbate particles wherein the information includes a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction (Misaka et al.: abstract; figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: temperatue: fig. 6]; inherent on pg. 4.4.1);

displaying the set information (Misaka et al.: figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-59; Baumann et al.: inherent on pg. 4.4.1);

generating the adsorbate particles in accordance with the set information and the positions of the corresponding emission sources (again, this is inherent in particle simulators such as Monte Carlo simulators; Misaka et al.: abstract; fig. 1,2; col. 2 lines 49-59 and 59-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: inherent on pg. 4.4.1); and

computing motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source (again, this is inherent in particle simulators such as Monte Carlo simulators; Misaka et al.: abstract; fig. 1, 2; col. 2 lines 49-59 and 59-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: pg. 4.4.1).

33. **As per claim 24, this is concerned with an apparatus for simulating phenomena of a particle formed with adsorbate particles, comprising:**

a kinetic condition setting unit (this is inherent in particle simulators such as monte Carlo simulators) **which sets information for defining kinetic conditions of the adsorbate particles** (Misaka et al.: figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-59; Baumann et al.: inherent on pg. 4.4.1) **wherein the information includes a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction** (Misaka et al.: abstract; figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: temperatue: fig. 6]; inherent on pg. 4.4.1), and

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed with adsorbate particles, each adsorbate particle having a corresponding emission source (again, this is inherent in particle simulators such as Monte Carlo simulators; Misaka et al.: abstract; fig. 1,2; col. 2 lines 49-59 and 59-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: pg. 4.4.1);

for each adsorbate particle, the kinetic condition setting unit sets a region indicating a position of the corresponding emission source (Misaka et al.: fig. 1, # 15; also inherent in figs. 2, 7, 8b, 10; Baumann et al.: inherent on pg. 4.4.1), **and**

the particle motion computing unit generates each adsorbate particle in accordance with the position of the corresponding emission source as indicated by the region set by the kinetic condition setting unit (Misaka et al.: fig. 1, # 15; Baumann et al.: pg. 4.4.1).

34. As per claim 25, this is concerned with an apparatus as in claim 24, wherein the information set by the kinetic condition setting unit (this is inherent in particle simulators such as Monte Carlo simulators) **defines a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period by the particle motion computing unit** (Misaka et al.: figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-59; Baumann et al.: inherent on pg. 4.4.1).

35. As per claim 26, this is concerned with an apparatus as in claim 24, wherein said particle formed with adsorbate particles is formed with both adsorbate particles and substrate particles,

the information set by the kinetic condition setting unit includes information for defining kinetic conditions of the substrate particles (Misaka et al.: figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-59; Baumann et al.: inherent on pg. 4.4.1); **and**

the particle motion computing unit generates the substrate particles before generating the adsorbate particles (this would seem to be obvious; why generate particles which are to interact with a target if the target is not there; Misaka et al.: figs. 1, 2, 4, 5, 7, 8b, 9, 10; Baumann et al.: pg. 4.4.1).

36. As per claim 27, this is concerned with an apparatus as in claim 24, wherein

said particle with adsorbate particles is is formed with both adsorbate particles and substrate particles,

each substrate particle includes a fixed particle and a temperature control particle (Baumann et al.: temperatue: fig. 6]),

the information set by the kinetic condition setting unit includes information for defining kinetic conditions of the fixed particle and the temperature control particle (Misaka et al.: figs. 1, 2, 5 ("calculate fluxes"); col. 2, lines 29-34 and 49-59; Baumann et al.: inherent on pg. 4.4.1), **and**

the particle motion computing unit generates the fixed particle and the temperature control particle of each substrate particle in accordance with the information set by the kinetic condition setting unit (again, this is inherent in particle simulators such as Monte Carlo simulators; Misaka et al.: abstract; fig. 1,2; col. 2 lines 49-59 and 59-64; col. 3, lines 3-68; col. 4, lines 1-6; Baumann et al.: inherent on pg. 4.4.1).

37. As per claim 28, this is concerned with an apparatus as in claim 24, further comprising a display which displays the information set by the kinetic condition setting unit (this is standard with respect to particle simulators in general. I have personally done this as it pertains to Monte Carlo simulations).

38. As per claim 29, this is concerned with an apparatus as in claim 24, wherein each adsorbate particle includes a plurality of atoms (Misaka et al.: fig. 1 ("radical"), fig. 2, fig. 4 (b,c,d); Baumann et al. fig. 1);

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against center of mass of the adsorbate particle (inherent in simulation of clusters); **and**

when the particle motion computing unit generates an adsorbate article and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against center of mass, the particle motion computing unit provides a random orientation to the atoms of the adsorbate particle (Official notice is taken that this physical phenomena and approximations so as to take it into account in simulations were well known in the art at the time of the invention. [see for example studies of ion attachment to electrodes submersed in salt solutions, studies of nucleation, or the motion of electrons around moving atoms or molecules]).

39. **As per claim 30, this is concerned with an apparatus as in claim 29, wherein, when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not fixed against center of mass, the particle motion computing unit provides an initial velocity to the atoms of the adsorbate particle** (Official notice is taken that this physical phenomena and approximations so as to take it into account in simulations were well known in the art at the time of the invention. [see for example studies of ion attachment to electrodes submersed in salt solutions, studies of nucleation, or the motion of electrons around moving atoms or molecules]).

40. **As per claim 31, this is concerned with an apparatus as in claim 24, wherein, when generating an adsorbate particle, the particle motion computing unit provides a random direction within a cone pointed at a substrate and being centered at a point of generation of center of mass velocity of the adsorbate particle** (Official notice is taken that this physical phenomena and approximations so as to take it into account in simulations were well known in the art at the time of the invention. [see for example studies of ion attachment to electrodes submersed in salt solutions, studies of nucleation, or the motion of electrons around moving atoms or molecules]).

41. **Claims 1, 3-9, 11-20, 22-26 and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over (Yamada et al. *or* Misaka et al. *or* Baumann et al. *or* Husinsky et al.) in view of (Kinema/SIM <u>or</u> Reeves <u>or</u> Cohen).**

42. Yamada et al. discloses details of a Monte Carlo simulation of sputtering. See entire disclosure. <u>Especially note fig. 1-3</u>.

43. Misaka et al. disclose a dry-etching process simulator wherein a surface reaction model is used to simulate topological evolutions by taking into account the existence of adsorbed radicals on the substrate surface. See figs. 1, 2, 3b, 4, 5 ("calculate fluxes"); col. 1, lines 35-68; col. 2, lines 29-34 and 49-59; col. 3, lines 16-68; col. 4, lines 50-65.

44. Baumann et al. disclose 3D modeling of sputtering using a mesoscopic hard-sphere Monte Carlo model. (see fig. 1 of Baumann et al.). Baumann et al. simulate the behavior of *clusters* as they interact with a substrate (note that the use of ion cluster beams and molecular

beams for deposition and/or sputtering are well known techniques; this phenomena has also been simulated.). See pg. 4.4.1 and fig. 1-2.

45. Husinsky et al. disclose "*Fundamental aspects of SNMS for thin film characterization: Experimental studies and computer simulations.*" They further disclose that the idea of secondary neutral mass spectroscopy (SNMS) as a tool for surface analysis dates back to the early 1970s. Recently, due to the development of new and effective post ionization tools, i.e. lasers, this method has become an interesting alternative to more conventional methods for various applications in surface analysis, as for instance depth profiling or characterization of thin films. SNMS, in general, involves a more complicated apparatus than other techniques, due to the additional post-ionizing stage. However, in the last few years it has been demonstrated by many groups that for several situations SNMS offers substantial advantages as compared with conventional methods, in particular secondary ion mass spectrometry. In this paper they evaluate the current situation of SNMS, in particular laser-SNMS, for applications related to the field of thin film research. On behalf of experimental studies and ***computer simulations of various phenomena related to SNMS*** they show the possibilities, advantages and also problems associated with the method. See section 4 (sputtering) including section 4.1 (sputtered flux - fig. 4, 9 and 16 - showing combined particles); section 4.3 (computer simulation of sputtering) and section 4.4 (cluster emission).

46. (Yamada et al. *or* Misaka et al. *or* Baumann et al. *or* Husinsky et al.) discloses all claim limitations except for a teaching animation of the simulation. (Kinema/SIM *or* Reeves *or* Cohen)

teach that it was obvious and well known to one of ordinary skill in the art at the time of the invention to animate simulations of physical processes. (Kinema/SIM *or* Reeves *or* Cohen) provide details about animations of particles. The teachings of (Kinema/SIM *or* Reeves *or* Cohen) are subsequently presented.

47. Kinema/SIM is a software tool that presents a simulation space for particle behavior where you can construct and animate complex physical phenomena. See entire disclosure. A number of features are subsequently listed for Applicant's benefit.

- Examples of the graphical interface are shown on pp. 1-8 to 1-9;
- the "particle window" is shown on pg. 2-7; here the particle parameters can be altered;
- "Lifetime" defines the particle lifetime (pg. 2-9);
- "particle geometry" is discussed on pg. 2-11;
- "coordinate systems" are discussed on pg. 3-3;
- entering particle parameter values via slider buttons (pg. 3-10;
- probibility functions for particle speed, lifetime, emission angles (pg. 3-11);
- other relevant temporal parameters (pg. 3-16);
- GUI simulation controls (pg. 5-2);
- statistical features (ie., *group behavior* - pg. 5-3);
- particles, obstacles (pg. 5-5);
- deatils about simulation parameter values including source rate, display, particle interactions and emission sources (chapter 6);

- range of interactions between particles (pg. 6-3);

- source rate (pg. 6-4);

- a combined particle (pg. 6-5), wherein

> *"The Euler mode, on the other hand, calculates forces more globally and therefore has the advantage of maintaining simulation speed. It calculates only one force per cell at time t, which is applied to **all particles in the cell.** ...";*

- Chapter 7 discloses "Particles";

- particle coupling (pg. 7-1);

- particle examples (pg. 7-1), wherein

> *"Particles are the key element in Kinema/SIM simulations. They are point objects that can represent a broad range of physical and image characteristics such as mass, charge, color, motion and geometry. In your simulation, particles can represent a diversity of real or image objects such as quantum physics particles, gas molecules, aerosol droplets, bacteria, fluid flow, dust, rain, snow, sand, or pixels of images. The possibilities are as numerous as the phenomena of reality and creative animtion ...*
>
> *... Particles are emitted into the simulation via sources which can be visible or invisible points or geometric objects positioned in simulation space. ...";*

- particles parameter window (pg. 7-3 to 7-4);

- *"Sigma", a parameter related to particle-particle interactions* (pp. 7-13 to 7-14);

- decay particles (pg. 7-21);

- particle coupling (pp. 7-22 to 7-23);

- Chapter 8 (source parameters);

- sources (pg. 8-1), wherein

> *"Sources are orgins that emit particles into the simulation, and all particles must enter the simulation via a source. Sources can be points or have spatial geometry which you can choose to see or hide in simulation space. You can define as many sources as you like for a system, but each source is restricted to emit only one particle type. (If you want to have more than one particle type originate from the same position, you can superimpose sources at the point. ...*
>
> *... In the source window you assign a particle type to the source and then define the rate and speed of the particles along with their spread angle into the simulation. ..."*

<u>The "spread angle" is Applicant's "cone".</u>;

- source window (pg. 8-3);
- source rate (pg. 8-4);
- <u>**Spread**</u> (pg. 8-5);
- speed (pg. 8-6);
- source position (pg. 8-10);
- display (pg. 8-11);
- geometry (pg. 8-13);
- particle emission and geometry (pp. 8-15 to 8-16);
- particle generation (pp. 8-16 to 8-17);
- Chapter 9 "Obstacles";
- Chapter 13, "electric fields";
- Chapter 15, "particle events";

- <u>elastic and inelastic particle collisions</u> (pp. 15-1 to 15-2);

48. Reeves discloses animation of particle behavior and discloses the concept of combined particle. On page 91,

> *"First, an object is represented not by a set of primitive surface elements, such as polygons or patches, that define its boundary, but as clouds of primitive particles that define its volume."*

Section 2.1 discloses particle generation. Section 2.2 discloses:

> *"For each new particle generated, the particle system must determine values for the following attributes:*
>
> *(1) initial position,*
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> *(2) initial velocity (both speed and direction),*
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> *(3) initial size,*
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> *(4) initial color,*
>
> *(5) initial transparency,*
>
> *(6) shape,*
>
> *(7) lifetime.*

Section 2.3 discloses particle dynamics.

49. Cohen discloses "*Computer animations, quantum mechanics and elementary particles.*" See entire disclosure. The following is from pg. 165;

> *"In a typical animation, starting from a small number of virtual particles, the number tends to increase as a function of time, signaling the deviation from the physical states. <u>A physical particle contains a cloud of finite size of virtual particles.</u> The animation actually allows us to see the formation of such clouds. It is rather amusing to identify <u>dressed objects</u> mainfesting <u>collective behavior</u>, and then analyze the space renormalization group of the clouds by zooming in."*

On page 166, the following is found:

> *The visualization "dictionary" developed for computer animations of quantum systems* ***can be applied to any process following the rules of one or several of Nature's fundamental interactions. Animation of various atomic and subatomic phenomena*** *such as electron orbitals, particle collisions, radiactive decay, fusion, fission, etc. are therefore feasible and instructive."*

50. Claims 1, 3-9, 11-20 and 22-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over [Ohira et al. (Applicant - Applicant's IDS).] in view of (Kinema/SIM *or* Reeves *or* Cohen).

51. Ohira et al. discloses details of a Molecular-dynamics simulation of sputtering. See: abstract; pg. 2 (Theoretical Methods) and especially fig. 1.

52. [Ohira et al.] discloses all claim limitations (**see fig. 1 - temperature control particles**) except for a teaching of animation of the simulation. (Kinema/SIM *or* Reeves *or* Cohen) teach that it was obvious and well known to one of ordinary skill in the art at the time of the invention to animate simulations of physical processes. (Kinema/SIM *or* Reeves *or* Cohen) provide details about animations of particles. The teachings of (Kinema/SIM *or* Reeves *or* Cohen) were presented earlier.

Response to Arguments

53. Applicant's arguments filed 8/22/2002 and 2/27/2003 have been fully considered but they are not persuasive. Applicants again have not responded to most of the particulars of the rejections nor the Examiner's responses to Applicant's arguments. They are, therefore, repeated again.

Arguments of 2/27/2003:

54. The 112 arguments not persuasive. "Physical condition" is ambiguous, especially in light of the quoted section of the specification. Applicants still have not explained how the particles are formed. See 112 rejection in paper # 35. 2) 103 Rejections: Applicants have not addressed the merits of the rejctions other than to allege that they are somehow improper (inherency, motivation, for example). These arguments are not persuasive. Applicants appear to argue that it is not inherent to have a particle source for a particle simulation. The Examiner wonders how such a simulation could be carried out without specifying a source. The particles must be accounted for at all times in their trajectories, including initial conditions. It is noted that the Examiner has relied on inherency since at least paper # 6 (*five years ago* - 1998). Applicants have earlier acquiesed to such a determination by their silence. The Examiner respectfully submits that such arguments are late in the prosecution and respectfully are simply not persuasive. Again, Applicans have not explained or even offered any reasoning how such a simulation as disclosed in the art could be carried out without specifying a source. Applicants also allege that the Examiner has not provided a proper motivational statement. It is noted that there are numerous 103 rejections, but Applicants have not specified which if any are deficient. Consider paragraph 46 of paper # 35, for example. The Examiner respectfully submits that the paragraph indeed discloses a proper motivational statement.

55. Applicants refusal to argue the merits of the rejections because of alleged deficiencies is based upon an unproven premise. The rejections are maintained.

56. Applicants have supplied source code. The request is therefore withdrawn. The Examiner notes that Applicants have not directed Examiner's attention to any particular section of the code or commented on any of the disclosure. The Examiner further notes the following after a cursory review of the disclosure. File "com_passwd.h" discloses a date of 13.Feb.97 and "MASPHYC/MD" discloses a date of 10/31/2001.

Arguments of 8/22/2002:

Regarding the 112(1) rejections/Claim Interpretations (pages 4-5, paper 34):

57. As per claims directed at "formed *particles*", Examiner has reviewed pp. 31-33 of the specification. The specification only describes the possible composition of the combined particles; but, does not describe *how* the components of the combined particle are combined or formed. The meaning is not clear especially in light of Applicant's various comments in paper # 9 as well as those provided in papers # 16, # 19, # 26 (pp. 4-5), # 29 and # 34. The matter is still not resolved. It is noted that Applicants direct Examiner's attention to a web site. The Examiner will consider an Information Disclosure Statement. The effective content and date of a website is subject to change. Furthermore, the Examiner notes that the date of the earliest software (on the site) is apparently 2001, while Applicant's effective filing date is 12/1996.

58. Applicants are reminded that the claims were rejected under 35 U.S.C. 112, first paragraph, because *they contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.* In response, Applicants simply asserts that it does

not matter how the particles are combined. How could *one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention*, namely combined particles, if the *subject matter was not adequately described in the specification?*

59. Applicants have stated that the concept "*combined*" is of no consequence. However, the particles would have to be "combined" in some fashion during the simulation. The Examiner respectfully submits that it would constitute ***undo experimentation*** to determine how to "combine" the particles. Furthermore, in so far as Applicants have stated (first paragraph, page 5, paper # 26) that limitations directed at "combining" are not to be given patentable weight, the Examiner interprets that reference to "absorbate" and "substrate" refer to intended use. There are no functional limitations which refer to "absorbate" and "substrate" other than *denotation* of the individual particles. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). As stated in paper # 27:

> "Therefore, any prior art which recites simulation of a trajectory of a "combined particle" is interpreted as reading on the claims. *The Examiner will*

remove the 112(1) rejections in the event that Applicants agree with the above interpretations."

60. Furthermore, it is noted that Applicants abandoned the application after notice of allowance, since Applicants disagreed with Examiner's interpretation regarding "interacting" (which of course defines how the particles are combined or combined). Since this point is so important (page 13, paper # 12), the Examiner requires an explanation of how a reader of any issued patent could make and/or used the claimed invention absent the teaching of "combined" or "formed".

Regarding the 103 rejections (pages 5-10, paper 34):

61. The Examiner notes Applicant's arguments pertaining to the prior art rejections.

62. Applicants challenge (page 5, paper # 34) the taking of Official Notice relating to Monte Carlo simulations and displays. It is noted that Applicant had not provided any remarks concerning the Examiner's publication, pertaining to particle simulation using Monte Carlo techniques, in ***Physical Review***, which was provided for Applicant's benefit. Examiner's recollections were based on extensive experience in the field of particle simulation, and were provided for Applicant's benefit. See paragraph 67, paper # 15; paragraphs 7-8, paper # 9. Moreover, it is also noted that, considering the Applicant's remarks quoted above, and in view of the art provided by the Examiner in response to Applicant's demand (paragraph 67, paper # 15; paragraphs 7-8 of paper # 9), *there has been no substantial arguments or remarks directed at said supplied prior art.* In fact most of Applicant's remarks, have been directed at Examiner's

recollections; <u>there have been no substantial remarks directed at the prior art of record.</u> Applicant's silence (paper # 16) was regarded as acquiescence and therefore admitted prior art. In any case, the current challenge is neither seasonable (paper # 34) nor proper because Applicants have not even attempted to create on its face a reasonable doubt regarding the circumstances justifying the notice.

63. In response to applicant's arguments against the references individually (pp. 5-10, paper # 34), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Examiner <u>***again repeats***</u> the above in response to Applicant's continued "piecemeal" analysis of the 103 rejections. **These arguments apply to all of Applicant's arguments as they relate to the 103 rejections.**

64. As per emission sources - these are inherent in particle simulators. As per "*adsorbate*" and "*substrate*", please see the art rejections and the discussion, earlier relating to *intended use*. A particle simulator can not operate without a particle source.

65. Applicants have stated that the concept "*combined*" is of no consequence. In so far as Applicants have stated (first paragraph, page 5, paper # 26) that limitations directed at "combining" (which means the same as "***formed***", in the context of Applicant's invention) are not to be given patentable weight, the Examiner interprets that reference to "absorbate" and "substrate" refer to intended use. There are no functional limitations which refer to "absorbate"

and "substrate" other than *denotation* of the individual particles. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Therefore, any prior art which recites simulation of a trajectory of a "combined particle" is interpreted as reading on the claims.

66. In response to the abstract and conclusory arguments pertaining to *obviousness* and *motivation to combine* (pp. 6-7, paper # 34), please review the 103 rejections.

67. In general, Applicants appear to have again *mischaracterized* the prior art in spite of *numerous attempts* by the Examiner to correct the record. *The Examiner can only continue to repeat the rejections.*

68. Applicant's characterization of the teachings of Baumann and Misaka again trivializes and misstates their inventions - ***Again***, please refer to the detailed rejections as well as the teachings. For example, the characterization of the Baumann teaching as "*...incoming spheres ...*" again ignores the teaching of a simulation of Sputtering - *that which Applicant is attempting to claim.* ***Page 4.4.2 of Baumann discloses molecular dynamic simulation (simulation of***

trajectories). As per Misaka, see fig. 2; col. 9, line 65 to col. 10, line 9, wherein trajectories are discussed. ***In either Baumann or Misaka, it is inherent that a source must exist for each particle.***

69. Applicants; characterization of the teaching of Reeves trivializes and mischaracterizes the invention - Please refer to the detailed rejections as well as the teachings. *For example, and Examiner would again like to point out -* ***reference to "fuzzy" is irrelevant and has absolutely nothing to do with the issues at hand.*** As recited in the last ***five*** Official Office Actions: "Reeves discloses ***animation of particle behavior*** and discloses the concept of combined particle. On page 91,

> *"First, an object is represented not by a set of primitive surface elements, such as polygons or patches, that define its boundary, but as clouds of* ***primitive particles*** *that define its volume."*

Section 2.1 discloses particle generation. Section 2.2 discloses:

> *"For* ***each new particle generated****, the particle system must determine values for the following attributes:*
>
> *(1)* ***initial position,***
>
> *(2)* ***initial velocity (both speed and direction),***
>
> *(3) initial size,*
>
> *(4) initial color,*
>
> *(5) initial transparency,*

(6) shape,

(7) lifetime.

Section 2.3 discloses particle dynamics."

Please note the bold-faced portions - ***which define particle sources***.

70. As recited in the last ***five*** Official Office Actions, "Cohen discloses "*Computer animations, quantum mechanics and elementary particles.*" See entire disclosure. The following is from pg. 165;

> *"In a typical animation, starting from a small number of virtual particles, the number tends to increase as a function of time, signaling the deviation from the physical states. A physical particle contains a cloud of finite size of virtual particles. The animation actually allows us to see the formation of such clouds. It is rather amusing to identify dressed objects mainfesting collective behavior, and then analyze the space renormalization group of the clouds by zooming in."*

On page 166, the following is found:

The visualization "dictionary" developed for computer animations of quantum systems ***can be applied to any process following the rules of one or several of Nature's fundamental interactions.*** ***Animation of various atomic and subatomic phenomena*** *such as electron orbitals, particle collisions, radiactive decay, fusion, fission, etc. are therefore feasible and instructive.""*

Cohen discloses particle sources.

71. As recited in the last ***five*** Official Office Actions: "Kinema/SIM is a software tool that presents a simulation space for particle behavior where you can construct and animate complex

physical phenomena. See entire disclosure. A number of features are subsequently listed for Applicant's benefit.

- Examples of the ***graphical interface*** are shown on pp. 1-8 to 1-9;
- the "***particle window***" is shown on pg. 2-7; here the **particle parameters can be altered**;
- "Lifetime" defines the particle lifetime (pg. 2-9);
- "***particle geometry***" is discussed on pg. 2-11;
- "***coordinate systems***" are discussed on pg. 3-3;
- entering particle parameter values via slider buttons (pg. 3-10;
- probability functions for ***particle speed, lifetime, emission angles*** (pg. 3-11);
- other relevant temporal parameters (pg. 3-16);
- ***GUI simulation controls*** (pg. 5-2);
- statistical features (ie., *group behavior* - pg. 5-3);
- ***particles, obstacles*** (pg. 5-5);
- deatils about simulation parameter values including ***source rate, display, particle interactions and emission sources*** (chapter 6);
- ***range of interactions between particles*** (pg. 6-3);
- ***source rate*** (pg. 6-4);
- ***a combined particle*** (pg. 6-5), wherein

*"The Euler mode, on the other hand, calculates forces more globally and therefore has the advantage of maintaining simulation speed. It calculates only one force per cell at time t, which is applied to **all particles in the cell.** ...";*

- Chapter 7 discloses "***Particles***";

- ***particle coupling*** (pg. 7-1);

- particle examples (pg. 7-1), wherein

"Particles are the key element in Kinema/SIM simulations. They are point objects that can represent a broad range of physical and image characteristics such as mass, charge, color, motion and geometry. In your simulation, particles can represent a diversity of real or image objects such as quantum physics particles, gas molecules, aerosol droplets, bacteria, fluid flow, dust, rain, snow, sand, or pixels of images. The possibilities are as numerous as the phenomena of reality and creative animtion ...

... Particles are emitted into the simulation via sources which can be visible or invisible points or geometric objects positioned in simulation space. ...";

- particles parameter window (pg. 7-3 to 7-4);

- *"Sigma", a parameter related to particle-particle interactions* (pp. 7-13 to 7-14);

- decay particles (pg. 7-21);

- particle coupling (pp. 7-22 to 7-23);

- Chapter 8 (source parameters);

- ***sources*** (pg. 8-1), wherein

"Sources are orgins that emit particles into the simulation, and all particles must enter the simulation via a source. Sources can be points or have spatial

> ***geometry which you can choose to see or hide in simulation space. You can define as many sources as you like for a system, but each source is restricted to emit only one particle type. (If you want to have more than one particle type originate from the same position, you can superimpose sources at the point. ...***
>
> > ***... In the source window you assign a particle type to the source and then define the rate and speed of the particles along with their spread angle into the simulation.*** ..."

The "spread angle" is Applicant's "cone".;

- source window (pg. 8-3);
- source rate (pg. 8-4);
- **Spread** (pg. 8-5);
- speed (pg. 8-6);
- ***source position*** (pg. 8-10);
- display (pg. 8-11);
- geometry (pg. 8-13);
- ***particle emission and geometry*** (pp. 8-15 to 8-16);
- ***particle generation*** (pp. 8-16 to 8-17);
- Chapter 9 "Obstacles";
- Chapter 13, "electric fields";
- Chapter 15, "***particle events***";

- elastic and inelastic particle collisions (pp. 15-1 to 15-2)".

Kinema/Sim discloses particle sources. **Applicants's response is simply not credible. Examiner can only *again repeat* the request that Applicants please review the art rejection and the art.**

72. Any inquiry concerning this communication or earlier communications from the examiner should be:

directed to:

Dr. Hugh Jones telephone number (703) 305-0023, Monday-Thursday 0830 to 0700 ET, ***or*** the examiner's supervisor, Kevin Teska, telephone number (703) 305-9704. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 308-9051 (for formal communications intended for entry)

or (703) 308-1396 (for informal or draft communications, please label "*PROPOSED*" or "*DRAFT*").

Dr. Hugh Jones

Primary Patent Examiner

March 11, 2003

HUGH JONES Ph.D.
PRIMARY PATENT EXAMINER
TECHNOLOGY CENTER 2100